

PubMed®/MEDLINE® Basics: Finding What You Need



National Library of Medicine
www.nlm.nih.gov

NLM brochures and handouts: Available at: <http://nnlm.gov/gmr/training/handouts.html>
Advanced PubMed Searching Resource Packet: <http://nnlm.gov/training/resources/pubmedpacket.doc>
Full Text and PubMed: <http://nnlm.gov/training/resources/fulltexttri.pdf>
LoanSome Doc®: <http://nnlm.gov/training/resources/ldtrifold.pdf>
PubMed Basics: <http://nnlm.gov/training/resources/pmtri.pdf>
PubMed My NCBI: <http://nnlm.gov/training/resources/myncbitri.pdf>
Searching PubMed with MeSH: <http://nnlm.gov/training/resources/meshtri.pdf>

Related resources

NLM PubMed Online Training: <http://www.nlm.nih.gov/bsd/disted/pubmed.html>
NN/LM Non-English Guides to PubMed: <http://nnlm.gov/training/resources/intlpubmedlinks.html>
PubMed®/MEDLINE® Basics: <http://nnlm.gov/training/resources/pubmedbasic8.doc>
NLM PubMed®/MEDLINE® Advanced: <http://nnlm.gov/training/resources/pubmedadv8.doc>



This project has been funded in whole or in part with Federal funds from the National Library of Medicine, National Institutes of Health, Department of Health and Human Services, under Contract No. HHS-N-276-2011-00005-C with the University of Illinois at Chicago. Revised November 2011.

National Library of Medicine – www.nlm.nih.gov

The United States National Library of Medicine (NLM), part of the National Institutes of Health (NIH), is the world's largest medical library. The collections of the National Library of Medicine include more than seven million books, journals, technical reports, manuscripts, microfilms, photographs, and images on medicine and related sciences, including some of the world's oldest and rarest works. Additionally, there are a wide variety of databases available through NLM including genetics, consumer health, environmental health and toxicology, and the literature citation database: PubMed.

PubMed®



The PubMed database was developed by the National Center for Biotechnology Information (NCBI) at NLM and is one of the many databases under NCBI's Entrez retrieval system available on the Web. Since 1996, free access to MEDLINE has been available to the public online via PubMed. PubMed contains over 21 million bibliographic citations back to 1809, although the indexing of citations began in 1948.

PubMed is updated Tuesday through Saturday. Coverage is worldwide, but most records (about 90%) are from English-language sources and/or have English abstracts. PubMed provides links to the full-text of articles at participating publishers' Web sites and from PubMed Central. PubMed also includes links to images in PubMed Central, to biological data, sequence data and other molecular biology databases maintained by NCBI, and to chemical information in PubChem Substance, PubChem Compound and PubChem Bioassay databases.

Citations in PubMed

Most records are initially supplied electronically by publishers and are immediately made available via PubMed. They will have the status tag: **[PubMed - as supplied by publisher]**. Articles that are not yet available in print will include in the citation: **[Epub ahead of print]**.

All citations go through a quality control process. At the **[PubMed - in process]** step, 12 to 16 Medical Subject Headings (MeSH) terms (NLM's controlled vocabulary or keyword terms) are added to a citation, as well as links to other databases and information sources. The records are also checked for bibliographic accuracy. After this step is completed, the citations graduate to become MEDLINE records with the status tag: **[PubMed - indexed for MEDLINE]**. About 50% of citations move from submission to fully indexed MEDLINE citations within two months, although the length of time depends on the journal and the article. A relatively small number of records are included in PubMed – but are not selected for MEDLINE – and contain the status tag: **[PubMed]**.

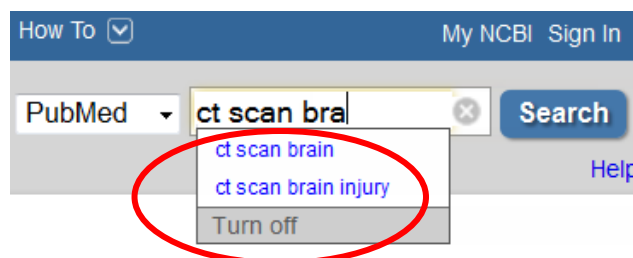
MEDLINE®

MEDLINE is the indexed subset of PubMed. MEDLINE contains over 19.2 million bibliographic citations and nearly 5,400 biomedical journals are currently indexed by NLM for MEDLINE. The scope of MEDLINE includes such diverse topics as microbiology, delivery of health care, nutrition, pharmacology and environmental health. The categories covered in MEDLINE include everything from anatomy, organisms, diseases, psychiatry, and psychology to the physical sciences.

Journals are selected for indexing by the Literature Selection Technical Review Committee (LSTRC) which meets three times a year and considers approximately 140 titles for MEDLINE at each meeting. Final approval is made by the Director of the National Library of Medicine. Titles are considered for scope and coverage, quality of content, quality of editorial work, production quality, audience, and type of content. For more details, see the NLM Fact Sheet, MEDLINE Journal Selection, at <http://www.nlm.nih.gov/pubs/factsheets/jsel.html>.

Searching PubMed

Enter significant search terms in the search box (e.g., *ct scan brain aneurysm*) and click on the **Search** button. Note that as you type, PubMed offers suggestions (e.g., *ct scan brain injury*). However, these suggestions are based on searches made by other researchers and may not accurately reflect an effective PubMed search on your topic. Turn off the autosuggest by clicking “Turn off” or set it permanently turn it off when signed into My NCBI under NCBI Site Preferences.



PubMed uses Automatic Term Mapping to translate the search and map the terms to the indexed or keyword database. The terms are mapped against:

- 1) The MeSH Translation Table (with headings, subheadings, publication types, entry terms (synonyms), etc.);
- 2) The Journals Translation Table (title, abbreviation, International Standard Serial Number ISSN, etc.); and
- 3) Authors and investigators translation tables and indexes.

If no match is found, PubMed breaks apart the long phrase from right to left and repeats the automatic term mapping process until a match is found. Terms that don't make a match will be searched in **All Fields**. Individual terms of a phrase will also be searched as **All Fields** and will be combined (ANDed) together.

- **ALWAYS** check Search Details after a search to see how PubMed tried to improve the search.

Search Details

Query Translation:

```
("tomography, x-ray computed"[MeSH Terms] OR
("tomography"[All Fields] AND "x-ray"[All Fields] AND
"computed"[All Fields]) OR "x-ray computed tomography"[All
Fields] OR ("ct"[All Fields] AND "scan"[All Fields]) OR "ct
scan"[All Fields]) AND ("intracranial aneurysm"[MeSH Terms]
OR ("intracranial"[All Fields] AND "aneurysm"[All Fields]) OR
"intracranial aneurysm"[All Fields] OR ("brain"[All Fields]
AND "aneurysm"[All Fields]) OR "brain aneurysm"[All Fields])
```

Search

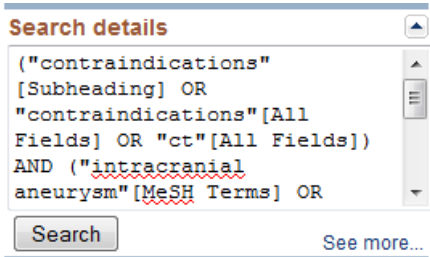
URL

In the case of *ct scan brain aneurysm*, the long phrase was broken into two separate segments:

ct scan AND brain aneurysm

After every search, scroll down the right hand column and review **Search Details** to verify PubMed performed the search you expected. Click **See more** to access the Query Translation box. Make any needed changes in the Search Details screen and rerun the search.

Example: How does PubMed perform these two searches?

A. Search for: <i>ct brain aneurysm</i>	B. Search for: <i>brain ct scan</i>
<p>View Search details in the right hand column.</p>  <p>Search details</p> <pre>("contraindications" [Subheading] OR "contraindications"[All Fields] OR "ct"[All Fields]) AND ("intracranial aneurysm"[MeSH Terms] OR</pre> <p>Search See more...</p> <ul style="list-style-type: none">• <i>ct</i> was mapped to the subheading, <i>contraindications</i>. Subheadings may be used to focus searches.• <i>brain aneurysm</i> is a MeSH synonym and was mapped to <i>intracranial aneurysm</i>.	<p>See the search details.</p> <p>No items found.</p> <p>In this case, there are no results. Click on Details link to discover why.</p> <p>Search Details</p> <p>Query Translation:</p> <pre>brain ct[Author] AND ("radionuclide imaging"[MeSH Terms] OR ("radionuclide"[All Fields] AND "imaging"[All Fields]) OR "radionuclide imaging"[All Fields] OR "scan"[All Fields])</pre> <p>Search URL</p> <ul style="list-style-type: none">• <i>brain ct</i> was mapped to the author: Dr. CT Brain; PubMed broke apart the search, found a match for the next phrase <i>brain ct</i>, and then stopped breaking apart the search.• <i>scan</i> was mapped to the broadest MeSH category of scanning: <i>radionuclitide imaging</i>.

Focus Your Search with *Limits*

PubMed [RSS](#) [Save search](#) [Limits](#) [Advanced](#) [Help](#)

Limit your search by using the drop-down menus or checking the appropriate boxes.

Dates
Published in the Last:
Any date
30 days
60 days
90 days
180 days
1 year
2 years
3 years
5 years
10 years
Specify date range

Type of Article
☒ Clinical Trial
☐ Editorial
☐ Meta-Analysis

Species
☒ Humans
☐ Animals

Languages
☒ English
☐ French
☐ German

Sex
☐ Male
☐ Female

Ages
☐ All Infant: birth-23 months
☐ All Child: 0-18 years
☒ All Adult: 19+ years

- **Publication Date:** Limit to a specific time period or to a range of dates (e.g. 1990:2000 or 2006/01/01:2008/12)
- **Type of Article:** Potential types of articles include clinical trials, meta-analysis and reviews
- **Species:** Limit to humans-focused research
- **Subsets:** Subset options include journal groups, topics including systematic reviews, and citations available in PubMed Central

Subsets
Journal Groups
☒ Core clinical journals
☐ Dental journals
☐ Nursing journals
Topics
☐ AIDS
☐ Bioethics
☒ Cancer

Text Options
☒ Links to full text
☐ Links to free full text
☒ Abstracts

- **Text Options:** Check with your librarian before using; you may eliminate items available to you through your library
- **Languages:** Limit to a specific language
- **Sex:** Limit to citations focusing on males or females.
- **Ages:** limit to a specific age group

NOTE: Be aware when using age and gender that the author must have clearly specified them in the article. Checking these boxes may eliminate articles with needed information.

<input type="button" value="Reset"/> <input type="button" value="Search"/> <ul style="list-style-type: none"> • Reset removes the limits applied in this section • Either Search button will run the search 	<p>Limits Activated: Humans, Clinical Trial, English Change Remove</p> <p>Limits Activated will appear on the search Results page. Click Change to return to Limits and make necessary changes; click Remove to remove all applied limits.</p>
---	--

PubMed Advanced (Search)

<p>Use Search History to combine previous searches.</p> <p>Example: previous searches on <i>cancer</i> (#3), <i>laser ablation</i> (#7) and <i>breast</i> (#8) may be combined to identify articles focusing on:</p> <p><i>laser ablation in cases of breast or lymph cancer.</i></p> <p>(Note: Lymph cancer is not a MeSH term)</p>	<p>Search History</p> <p>Search <input type="text" value=""/></p> <p>#8 Search breast #6 AND #7 OR #3 NOT Clear Delete View Search Details Save in My NCBI</p>	<p>Clear the search box if necessary. Click on each number and then AND to add it to your search. PubMed will add parentheses.</p> <p><input type="text" value="((#3) AND #7) OR #8"/></p> <p>Change the parentheses as needed in the search box and add any additional terms.</p> <p><input type="text" value="#3 AND #7 AND (#8 OR lymph)"/></p> <p>Click Search.</p>
--	--	--

More Resources

- **MeSH Database** – Use the Medical Subject Heading (MeSH) database to find appropriate terms for a search and to build search strategies
- **Journals in NCBI Databases** – Use to build journal and table of contents searches for PubMed
- **Single Citation Matcher** – Find individual citations easily
- **Clinical Queries** – Search filters including clinical studies and systematic reviews
- **Topic-Specific Queries** – Additional limit options

Search Results Options

On the *Results* screen you will find:

Search box: Which includes a drop-down menu to search other NCBI databases including MeSH

 **RSS** : Create an RSS Feed for the search

Save search: Save search strategies in My NCBI

Limits: Add or change search limits

Advanced: Additional options to focus a search

Help: Access the PubMed Help manual

Display Settings: Menu to change the results format

Send to: Menu to save or send selected citations

Filter your results: Use filters to sort or focus results


Find related data: Find records in other databases that cite the identified citations

Search details: View how PubMed does the search

Recent activity: Shows searches completed, citations and/or elements viewed, and the databases used

You may also see:

 **Limits Activated:** Appears with details when Limits are applied

 **Clipboard:** Appears when items have been stored temporarily on the Clipboard; **Item in clipboard** identifies selected citations in the Results list

Related searches: Suggestions based on searches performed by other researchers

***Titles with your search terms:** Appears when all search terms are in one or more citation titles

***Free full-text articles in PubMed Central:** Appears when one or more of the citations have a full-text article in PubMed Central, the free digital archive of biomedical and life sciences journal literature

***PMC Images search for:** Appears when images are found in PubMed Central for the term(s)

**Not available in Abstract display.*

Display Settings

Select the format, number of items and order in which you want the citations to be displayed, then click **Apply**.

- **Format:** Only two formats provide links to additional resources: *Summary* links to the individual citation; *Abstract* includes links to the Publication Types and MeSH Terms. The remainder of the formats appear as text in your browser.

Display Settings: Summary, 20 per page, Sorted by Recently Added

Format	Items per page	Sort by
<input checked="" type="radio"/> Summary	<input type="radio"/> 5	<input checked="" type="radio"/> Recently Added
<input type="radio"/> Summary (text)	<input type="radio"/> 10	<input type="radio"/> Pub Date
<input type="radio"/> Abstract	<input checked="" type="radio"/> 20	<input type="radio"/> First Author
<input type="radio"/> Abstract (text)	<input type="radio"/> 50	<input type="radio"/> Last Author
<input type="radio"/> MEDLINE	<input type="radio"/> 100	<input type="radio"/> Journal
<input type="radio"/> XML	<input type="radio"/> 200	<input type="radio"/> Title
<input type="radio"/> PMID List		

Apply

[Brain morphological signatures for chronic pain.](#)

Baliki MN, Schnitzer TJ, Bauer WR, Apkarian AV. PLoS One. 2011;6(10):e26010. Epub 2011 Oct 13.

PMID: 22022493 [PubMed - in process]

Free PMC Article

[Related citations](#) [Item in clipboard](#)

○ **Summary Display** provides links to the citation, *Related citations* and the *Item in clipboard* when applicable. Some citations include *Free article* or *Free PMC article*, accessed by clicking on the title.

○ **Abstract Display** also includes the full abstract, selected icons to full-text journals and library icons when signed into My NCBI.

- **Items per Page:** Default is 20; reveal up to 200 items on a page for review or printing
- **Sort by:** Reorder citations by date, author, journal title or article title

Send to: Selected citations may be sent to

- **File:** Save a text version of the citation as a document
- **Collections:** Save citations permanently with My NCBI Collections
- **Order:** Order selected citations through PubMed's LoanSome Doc[®] system
- **Clipboard:** Hold citations for up to eight hours
- **E-mail:** Email citations in any format to a specific address

Send to:

Choose Destination

<input type="radio"/> File	<input type="radio"/> Clipboard
<input type="radio"/> Collections	<input type="radio"/> E-mail
<input type="radio"/> Order	<input type="radio"/> My Bibliography

- **My Bibliography:** Add selected citations to an individual My NCBI Bibliography (for Resumes and CVs)

Filter the Results: Two default filters are provided: *Review* and *Free Full Text*.

- Click on the link (e.g. **Review**) to view the citations selected by that filter; the filter being viewed will be highlighted in yellow
- Click on the **Plus** symbol to append the filter to the search
- Use **Manage Filters** to change and/or add other filters; clicking on this link opens the **Search Filters** section in PubMed's My NCBI

Filter your results:

[All \(5368\)](#)

Review (941)

[Free Full Text \(1123\)](#)

[Manage Filters](#)



Print Citations from the Internet browser: Select the citation(s) and the format desired, then use the **File** and **Print** commands from the browser

Examine Individual Citations

PMID: 19643996 [PubMed - indexed for MEDLINE]
 + Publication Types, MeSH Terms, Substances
 + LinkOut - more resources

or other databases with the term.

- **Link Out** provides links to other resources related to the citation.

You may also see:

- **Images from this publication:** Citations in PubMed Central with images. Click **See all images** to access the PubMed Central Image database.

Images from this publication. [See all images \(7\)](#) [Free text](#)

- **Cited by xx PubMed Central article(s):** Links to articles in PubMed Central when available
- **Related information:** Links to other NCBI databases attached to the citation.

Publication Types, MeSH Terms, Substances

MeSH Terms

[Adolescent](#)
[Anesthesia, General](#)
[Appendicitis/radiography](#)
[Contrast Media/pharmacokinetics*](#)
[Female](#)
[Gastric Emptying*](#)
[Humans](#)
[Ileus/radiography](#)
[Iothalamic Acid/administration & dosage](#)
[Radiography, Abdominal*](#)
[Respiratory Aspiration/prevention & control](#)

[PubMed](#)
[MeSH](#)
[Add to Search](#)
[PubChem Compound](#)
[PubChem Substance](#)

Identify Specific Journals in the NLM Catalog

PubMed
 NCBI Web Site
NLM Catalog
 OMIA
 OMIM

Search

Journal information is now in the NLM Catalog. To create and save large collections of journals to add to a search, select **NLM Catalog** from the drop-down menu and click **Search**. Alternatively, use the **Journals in NCBI Databases** link from the PubMed Homepage.

Limit to Only PubMed journals

Journal Subsets

☒ Only PubMed journals
☐ Journals currently indexed in MEDLINE
☐ PubMed Central journals

Search by journal title or use the **Subject Term** [st] search to identify related journals (see <http://wwwcf.nlm.nih.gov/serials/journals/>). For example:
 Diagnostic Imaging[st] OR Nuclear Medicine[st] OR Radiology[st] OR Radiotherapy[st]

PubMed search builder

"J Med Imaging Radiat Oncol"
 [Journal] OR
 "Med Ultrasound" [Journal] OR
 "Brain Imaging Behav"

Add to search builder
 Search PubMed

Click on selected journals and then use the **Add to search builder** and then **Search PubMed** for the journals. Finally, saved this search in PubMed My NCBI and used it to focus future search on these journals.

PubMed
 "J Med Imaging Radiat Oncol"[Journal] OR

RSS
Save search
 Limits
 Advanced

Search

My NCBI



Use *My NCBI* to save citations, to save search strategies and to set personal preferences and filters

- Sign into My NCBI by clicking on the link in the upper right hand corner of PubMed
- Create a new account with **Register for an account**
- Optional options include **Keep me signed in** and **Sign in via Partner Organization**

The image shows two side-by-side login forms. The left form is titled 'My NCBI Sign In' and contains fields for 'Username:' and 'Password:'. Below these are checkboxes for 'Keep me signed in unless I sign out (Leave unchecked on public computers)' and 'Remember my username'. A 'Sign In' button is at the bottom. A red circle highlights the link 'Register for an account' below the 'Sign In' button. The right form is titled 'Sign in via Partner Organization' and lists options: 'Google', 'NIH & eRA Commons*' (with a note that eRA Commons account holders now enter login credentials on the NIH Login screen), and 'UKPMC Funders Group grantees'. Below these is a section 'Or choose from:' with a dropdown menu showing 'Case Western Reserve University', 'Colorado State University', 'Columbia University', and 'Cornell University'. A 'See expanded list >' link is below the dropdown. A 'Sign In' button is at the bottom.

My NCBI Options



- **Saved Searches:** Click **Save Search** from the **Results** screen to hold searches and/or have PubMed run the search and send email updates of citations meeting the search criteria. Use the **Tool Icon** to edit the update options or to delete a search
- **Collections:** save citations permanently by using the **Collections** option in the **Send to** menu. Add citations to a new or existing collection; Collections may be shared
- **My Bibliography:** Collections of citations by a specific author

- **Recent Activity:** While signed into My NCBI, searches and individually viewed items are stored for six months; past search strategies may be saved and citations viewed added to a collection
- **Filters:** Add links to citations available in a specific library or create a **Custom** filter based on a preset search

Customize this page | **NCBI Site Preferences** | Video Overview | Help

Common Preferences

- **Password:** Update and change as needed
- **Email Address:** Update and change as needed
- **Links Display:** For computers with pop-up limitations
- **Highlighting:** Of searched terms
- **Shared Settings:** Used by institutions to allow others to easily access their resources
- **Linked Accounts:** E.g. to NIH Manuscript Submission System

PubMed Preferences

- **Abstract Supplemental Data:** View MeSH headings
- **Document Delivery:** Service used by **Send to Order**
- **PubMed Filters & Icons:** Filters set under **Search Filters**
- **Outside Tool:** Used by institutions for document delivery
- **Auto Suggest:** Turn on or off when signed into My NCBI
- **Result Display Setting:** Set the number

Order the Full Text of Articles

PubMed's offers *LoanSomeDoc*, an article ordering system connecting health science library systems around the world.

- Go to: <https://docline.gov/loansome/login.cfm>
- **Sign up** by selecting and contacting a specific library

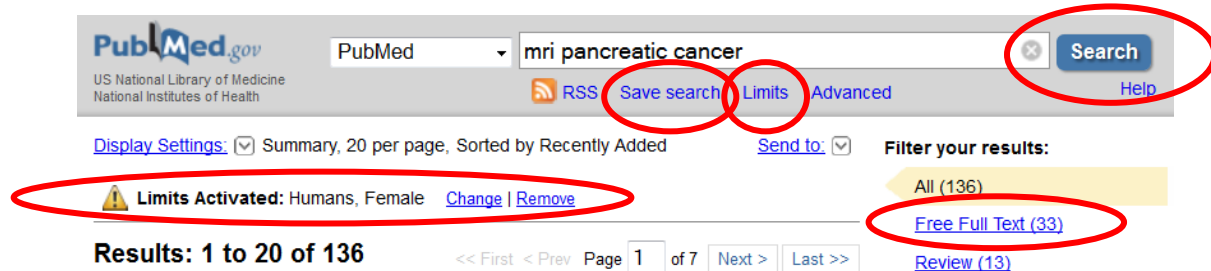
Once signed up, run a search, check the box(es) next to the article(s) desired, then use Send to Order and click on Order articles.

The image shows the 'LoanSomeDoc' login and sign up form. The header says 'National Library of Medicine'. The main heading is 'LoanSomeDoc' with the tagline 'Order biomedical literature from libraries.' Below this are fields for 'Email Address:' and 'Password:', followed by a 'Login' button. A link 'Forgot Password?' is below the password field. At the bottom, there is a link 'Don't have a Loansome Doc account? Sign up!'. A red circle highlights the 'Sign up!' link.

Exercises

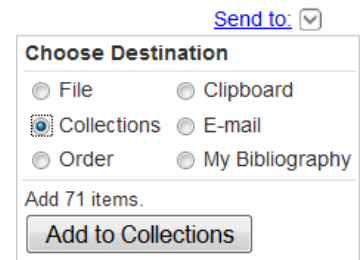
Exercise 1: Find full-text articles about MRIs on seniors with pancreatic cancer. Save the search.

- Check for **Limits Activated**; click **Remove** to clear or **Change** to access the Limits page. Or use the **Reset** button on the Limits page.
- In **Limits**, under **Ages**, check **Aged 65+ years**; under **Text Options**, check **Links to free full text** to link to citations free to everyone, everywhere
- **Clear** search box if necessary and enter **MRI** and **pancreatic cancer** in any order; click **Search**
- Note: As an alternative to the Limits check box, the **Free Full Text** filter link can be used
- Click **Save search** and follow the directions in **My NCBI**



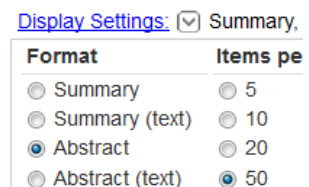
Exercise 2: Find articles of clinical trials of radiosurgery on female lung cancer patients. Create a collection of citations.

- Access and clear **Limits**; check the boxes for **Type of Article – Clinical Trial** and **Gender – Female**
- Enter **radiosurgery** and **lung cancer** in any order in the search box; click **Search**
- Select several citations or add all citations to a collection: Click the **Send to** menu, then **Collections**, then **Add to Collection** and follow the instructions to create a new collection or add to a previously created collection.



Exercise 3. Select find articles about the effects of contrast media in children with abdominal injuries. View the MeSH headings for several citations.

- Access and clear **Limits**; check **Ages – All Child: 0-18 years**
- Enter the search terms **contrast media** and **abdominal injuries**; click **Search**
- To view the MeSH terms, click **Display Settings** and **Abstract** under format, then click **Apply**
- Click on the **Plus** below a citation to review MeSH terms for that citation



[+ Publication Types, MeSH Terms](#)

NOTE: Click on a term to see the definition in the MeSH database or to add the term to a PubMed search.

Search details

```
((("contrast media"[MeSH Terms] OR ("contrast"[All Fields] AND "media"[All Fields]) OR "contrast media"[All Fields]) OR "contrast media"[All Fields]) OR "contrast media"
```

Search

[See more...](#)

- To view how PubMed handled the search – and to find additional search terms, click **See more under Search Details**

Search Details

Query Translation:

```
((("contrast media"[MeSH Terms] OR ("contrast"[All Fields] AND "media"[All Fields]) OR "contrast media"[All Fields]) OR "contrast media"[Pharmacological Action]) AND ("abdominal injuries"[MeSH Terms] OR ("abdominal"[All Fields] AND "injuries"[All Fields]) OR "abdominal injuries"[All Fields])) AND ("infant"[MeSH Terms] OR "child"[MeSH Terms] OR "adolescent"[MeSH Terms])
```

Search

URL

Result:

131